

CLAIMS

What is claimed is:

1. A power production system, comprising:

5 a combustion oxidizer source to provide a selected volume of a combustion oxidizer;

a combustion fuel source to provide a selected volume of a combustion fuel;

10 a plurality of a combustor to combust the selected volume of the fuel and the oxidizer, wherein combusting the selected volume of the fuel and the oxidizer form expanding gases;

a fan powered by the expanding gasses;

an ignition system to provide substantially simultaneous ignition of each of the plurality of the combustors.

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2. The power production system of Claim 1, wherein the plurality of the combustors each include a oxidizer pathway that provides a path to provide the oxidizer to main combustion chamber in each of the plurality of the combustors;

20 wherein the selected volume of the combustion fuel is mixed with the selected volume of the oxidizer flowing to the oxidizer pathway to be combusted in the main combustion chamber.

3. The power production system of Claim 2, wherein said ignition system includes a pilot that is able to combust the selected volume of the combustion fuel in the selected volume of the combustion oxidizer.

5 4. The power production system of Claim 1, wherein said ignition system includes a combustion wave chamber in which a selected volume of an ignition oxidizer in a selected volume of an ignition fuel is combusted;

wherein the combustion of the selected volume of the ignition oxidizer and the selected volume of the ignition fuel forms a detonation wave.

10 5. The power production system of Claim 4, wherein said ignition system further includes an ignition line operable to transmit the detonation wave from the combustion wave chamber to each of the plurality of the combustors substantially simultaneously.

15 6. The power production system of Claim 1, wherein said ignition system includes an ignition line including a central tube to transmit the detonation wave, a first annulus to transmit a selected pilot oxidizer and a second annulus to provide a selected pilot fuel.

20 7. The power production system of Claim 1, wherein said ignition system includes a combustion wave chamber, an ignition line, and a pilot port;

wherein said combustion wave chamber is operable to produce a combustion wave that is transmitted along the ignition line to the pilot port.

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8. The power production system of Claim 1 further comprising an igniter to ignite a selected volume of an oxidizer and a fuel in the ignition system.

9. The power production system of Claim 8 wherein said ignition
5 source includes a spark source.

10. A combustion system, comprising:

a plurality of combustion chambers each including a main combustion chamber;

an oxidizer pathway to provide a flow of a selected volume of an oxidizer to each of said main combustion chambers;

a pilot port for each of said main combustion chambers to provide a pilot into each of said main combustion chambers;

a combustion wave chamber to initiate a detonation wave; and

an ignition line to transmit said detonation wave to said pilot port;

wherein a pilot is ignited with said combustion wave.

11. The combustion system of Claim 10, wherein said combustion wave chamber defines a void for holding a selected volume of an ignition oxidizer and ignition fuel to be combusted.

12. The combustion system of Claim 11, further comprising an igniter to ignite said selected volume of said ignition oxidizer and said ignition fuel in said combustion wave chamber to initiate the detonation wave.

13. The combustion system of Claim 12, wherein said ignition source includes a spark ignition source.

14. The combustion system of Claim 10, wherein said ignition line includes a central tube to transmit the detonation wave, a first annulus to provide

a selected volume of a pilot fuel, and a second annulus to provide a selected volume of a pilot oxidizer.

15. The combustion system of Claim 14, wherein said central tube, said
5 first annulus, and said second annulus are substantially concentric along a portion of the length of the ignition line.

16. The combustion system of Claim 14, further comprising a pilot port
wherein each of said annuli terminate at a selected point, such that the
10 detonation wave is able to ignite the pilot.

17. A method of igniting a plurality of pilots in a plurality of main combustion chambers, wherein each combustion chamber is separated from each of the other main combustion chambers, the method comprising:

forming a detonation wave;

5 transmitting the detonation wave to at least one of the main combustion chambers;

at least one of providing and flowing a selected volume of a pilot oxidizer and a pilot fuel to the main combustion chamber; and

igniting the selected volume of the pilot oxidizer and the pilot fuel;

10 combusting a selected main fuel; and

powering a turbine with the combusting main fuel.

18. The method of Claim 17, wherein forming a detonation wave includes:

15 igniting a selected volume of an oxidizer and a fuel, wherein the ignition forms the detonation wave.

19. The method of Claim 17, further comprising:

forming a deflagration wave; and

20 transmitting the deflagration wave along a selected length of a transmission line to convert said deflagration wave to the detonation wave.

20. The method of Claim 18, wherein said oxidizer is molecular oxygen and said fuel is molecular hydrogen.

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21. The method of Claim 18, wherein igniting a selected volume of an oxidizer and the fuel includes spark igniting the selected volume of the oxidizer and the fuel at a selected time.

5 22. The method of Claim 17, wherein transmitting the detonation wave to the at least one of the main combustion chambers includes transmitting the detonation wave to a plurality of the main combustion chambers substantially simultaneously.

10 23. The method of Claim 22, wherein transmitting the detonation wave to a plurality of the main combustion chamber substantially simultaneously ignites a plurality of pilots substantially simultaneously.

15 24. The method of Claim 23, wherein each of the plurality of the pilots combust the selected main fuel substantially simultaneously in the plurality of the main combustion chambers.